IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : : Group Art Unit: 3746
DERRICK SIMONS et al. : : Examiner: KIM
Serial No. 10/801533 : Response to Paper No. 6
Filed: MARCH 17, 2004 :
For: TURBINE COMBUSTOR TRANSITION PIECE HAVING DILUTION HOLES

DECLARATION OF DERRICK SIMONS UNDER 37 CFR 1.132

I, DERRICK SIMONS, one inventor of the above-identified application, declare:

I received the degree of Master of Science in Mechanical Engineering from The Pennsylvania State University in December 1997. Furthermore, that I conducted graduate studies at The Pennsylvania State University Propulsion Lab in 1996 & 1997. From 1997 to 2000 I worked in the combustion (augmentor) design team at Pratt & Whitney Large Military Engines, West Palm Beach, FL. From 2000 through present, I have worked at GE Energy in Greenville, SC. During my employment with General Electric, my work has been as a Combustion Design Engineer in the Combustion Technology organization. My duties include design, analysis, test, and strategic technology planning of combustion systems and combustion system components.

As described by the claims in the associated application, a combustion system component for location between a turbine combustor and a first stage turbine airfoil comprises: a transition piece, which includes a body defining a flowpath and having a generally circular inlet end for receiving combustion products from the combustor and a generally rectilinear outlet end for flowing the combustor products into the first stage nozzle; wherein the body defines, between the inlet end and the outlet end, an enclosure for confining the flow of combustion products between those ends; a

plurality of dilution holes formed in the transition piece body in a first zone adjacent the inlet end and in a second zone adjacent the outlet end for flowing dilution air into the transition piece body; where the dilution holes are sized such that substantial equal quantities of the dilution air flow into the flowpath in the zones, respectively.

The reduction of emissions of the combustion system as claimed, including those potentially harmful to the environment is a recognized benefit of the instant hole configuration geometry, as claimed.

Performance is measured in terms of emissions, stability (dynamics) and combustor exit temperature profile (effecting downstream hot turbine components).

The hole locations/sizes or hole configuration geometry were selected based on multiple laboratory iterations and testing of the hole configuration geometry, with an emphasis on enhancing operation and reducing emissions.

Each successive hole configuration geometry was defined through evaluation of previous performance results and engineering analysis of past hole configuration geometries during laboratory iterations and testing.

Numerous hole configuration geometries were investigated and approximately 7 or 8 hole configuration geometries were actually tested to determine an enhanced hole configuration geometry to balance both emissions and performance of the combustion system.

Based on my professional experience and consulting with other engineers with additional experience in combustion systems, it is industry practice to determine desirable hole configuration geometries based on laboratory iterations and testing of hole configuration geometries. No other methodology to develop such hole configuration geometries, with an emphasis on enhancing operation and reducing emissions, is presently known to be as effective. The experimentation involved is neither routine nor predictable.

It is also noted that the Ansart patent relied upon by the Examiner for teaching varying hole sizes and locations relates to a combustion chamber, not a transition piece, and the reason for achieving the desired differential permeability (different flow rates at different locations in the combustion chamber wall to accommodate different pressure drops) is to optimize the temperature profile of the combustion chamber by controlling cooling flow. In fact, Ansart's teaching of varying the air flow permeability is at odds with the present invention, where substantially equal quantities of air flow into the flowpath in the first and second zones.

In conclusion, it is my opinion that the Examiner has erred in stating that the number, size and location of the holes in the transition piece as defined in amended claims 1 and 9 relate to "an obvious matter of finding the workable ranges". The laboratory iterations noted above were not designed merely to find "workable" ranges, but rather, to identify arrangements that provide enhanced operation with reduced emissions. The Ansart reference is not at all instructive in this regard, and fails to suggest the claimed subject matter in any event, with or without further consideration of Jorgensen and/or Howard.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Derrick Simons

DERRICK SIMONS

9/19/2007

Date